Fall 2002

Infrastructure and Improvisationalism

Nick Saponara

Nick Saponara
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Professor Munly
Professor Ruff

and Improvisationalism

contents

contention

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Infrastructure serves as a multi-scaled organizing urban *framework* in which material practices impose an *identity* on a given place allowing for the activation of otherwise static conditions.

Abstract

The city is highly structured; a relentless system of flows, mechanistic networks of organization, and efficient modes of operation all contributing to an urban infrastructural underpinning. It is this underpinning that allows for the dynamicism of the city. The city is comprised of independent and static elements that are activated only when linked to systems of infrastructure. The grid of New York, for example consists of isolated and inert blocks. The system of connections between these constituent element, the streets and subways (macro) and sidewalks (micro) are credited with the activation of the city. It is a theory that can be applied to all scales; the island of Manhattan is made dynamic by its connections to bridges and tunnels, and so on.

The speculation is applicable in the social realm as well. The city is a mosaic of cultural conditions, a result of the human nature of civilizations to create identity and a sense of territory. Each locality, however distinct from the next, is dependent on the connective systems of communication and exchange. As a result of the necessities of daily functions and accidental interdependencies, boundaries are negotiated and cultural overlaps occur.

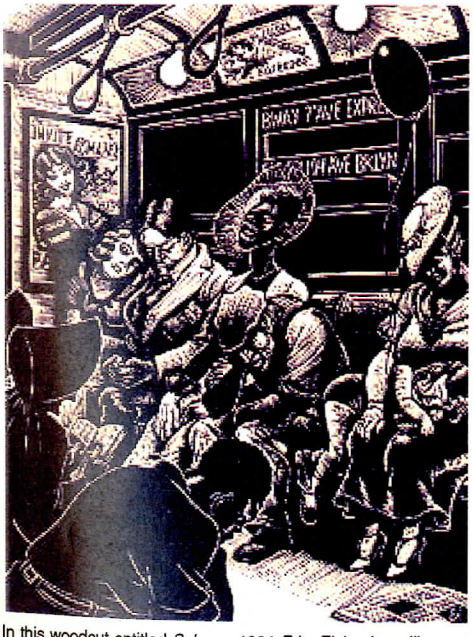
Stations and paths together form a system. Points and lines, beings and relations. What is interesting might be the construction of the system, the number and disposition of stations and paths. Or it might be the flow of messages passing through the lines. In other words, a complex system can be formally described...One might have sought the formation and distribution of the lines, paths, and stations, their borders, edges and forms. But one must write as well of the interceptions, of the accidents in the flow along the way stations...What passes may be a message but static prevents it from being heard, and sometimes from being sent.

- Michel Serres

Framework

As a connective underpinning of both physical and transient conditions, the infrastructure of the city must be rigorous yet adaptive, expansive yet specific. Its role, I would argue, is not merely an expression of the human condition, but an intervention thereof. The architecture of infrastructure serves a duality; it has the potential to instigate in an anticipatory fashion how people might use or inhabit a space and, in turn, acts as a "net" in capturing the episodes that unfold on its stage. In essence, it is a framework conducive to particular activities that relies upon its actors to create the storyline.

In that regard, the "material practices," or way in which the architecture can imply a preconceived performance, becomes not only an important criteria for design but also a means for evaluating the resultant use. It stops short, however, of interpreting the meaning behind the use, as it is left to the inhabitant to determine subjectively.



In this woodcut entitled *Subway 1934*, Fritz Eichenberg illustrates a group of passengers aboard an IRT Broadway-Seventh Avenue express train. Men, women, and children share this late night train fast asleep, with few reservations of personal space or safety.

Identity

As a primary infrastructural system of the city, the subway is a catalyst for the commingling of people representing all ages, races, religions, classes and sexes. This synthetically intimate experience is often the only representation of the culturally rich communities in which the players reside. Beyond the expression of the individual, the particular points of threshold between the sub-grade world and the locality remain a sterile unstained condition that begs for a character unto itself.

The definition (and creation) of *place* is highly debated in architectural discourse. The act of transforming a space into a place is an act of social responsibility. By nature, the inhabitant activates a place creating a dynamic and ephemeral condition closely tied to a particular locale. It can be a literal manifestation of perceptual identity such as typology or materiality or it may reveal itself in far less tangible forms such as through speed of movement or auditory and olfactory stimulation. Regardless of definition, New York City is agreeably a conglomeration of different "places" that as a system collectively maintain the vitality or the urban environment.

However, one must be cautious of portraying a reduction of the "local" to an "image of the local." In the end, the sense of place becomes defined, not at the level of symbolism, but through "complex fields of practices."[1]

The urbanite is self-assured and well-informed, finds his freedom and chooses his own sub-culture. The city is his domain, exciting and seductive. He has proved himself capable of finding his way around the new landscape and of making places his own.

- Adriaan Geuze, West 8

1. Howeler, Eric. "Site of Interface: Cultural Identity & the Asian Skyscraper." Thresholds v. 17 (1998): 5-11.

infrastructure

(method)

rethinking infrastructure

The American landscape has fallen victim to the contagious symptoms of postmodernism. The architecture of sign and surface has failed to deliver the meaning for which the search was inspired. Although the disciplines of film, literature, and internet have brought compelling theoretical debates into the discourse, little has manifested in a *meaningful* way. Stan Allen argues that the architect, to some degree, is responsible for the disintegration of a meaningful built environment by embracing a marginalized architecture of representation.

Infrastructural urbanism offers the beginnings of a reclamation of a well-structured city. Its distinction from representational modes lies in the fact that it is based on an architecture of performance; a material practice that "works in and among things and not exclusively with meaning and image."[1] The emphasis is on what things can actually do, not so much how they are perceived.

This redefined "architecture of infrastructure" has the ability to organize the city in ways in which other disciplines cannot. Although heavily rooted in an engineered condition of quantitative design, it has an inherent social responsibility - a more qualitative set of factors that respond to the temporal conditions of a place.

A city of surface signs and images offers little to the realm of a meaningful architecture.

1. Allen, Stan. *Points + Lines: diagrams and projects for the city.* New York: Princeton Associated Press, 1999.

"The time has come to approach *architecture* urbanistically and *urbanism* architecturally"

- Alison Smithson

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barcelona manual

In 1996 Stan Allen released a manual examining the potential of infrastructural urbanism in guiding the developing of Barcelona's existing port facilities on the edge of the city. Allen simultaneously rejected the notion of chaos associated with the suburban landscape as well as traditional urban patterns. The result was a flexible infrastructure that maintained a unified identity and negotiated "a degree of play between form and event." The following is a descript categorization of various program scenarios and the interactions thereof:

1. ***surface*** *- division and allocation of surfaces*
Infrastructure works not so much to propose specific buildings on given sites, but to construct the site itself. Infrastructure prepares the ground for future building, and creates the conditions for future events.

2. ***service*** *- provision to support future programs*
Infrastructural work recognizes the collective nature of the city, and allows for the participation of multiple authors. Infrastructures give direction to future work in the city not by the establishment of rules or codes, but by fixing points of service, access and structure. Infrastructure creates a directional field, where different architects and designers can contribute, but it sets technical and instrumental limits to their work. Infrastructure itself works strategically, but it encourages tactical improvisations. Although static in and of themselves, infrastructures organize and manage complex systems of flow, movement, and exchange. Not only do they provide a network of pathways, they also work through systems of locks, gates, and valves - a series of checks that control and regulate flow.

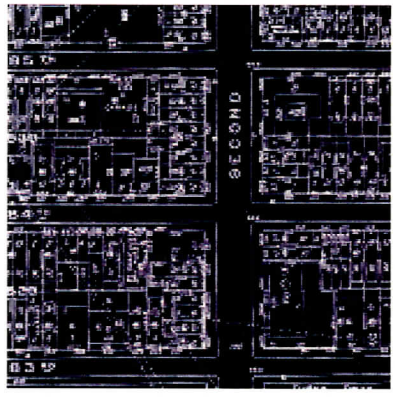
3. ***organization*** *- spatial and formal models*
Infrastructures accommodate local contingency while maintaining overall continuity. In the design of highways, bridges, canals or aqueducts, for example, an extensive catalogue of strategies exist to accommodate irregularities in the terrain. Infrastructure's default condition is regularity 0 in the desert, the highway runs straight. Infrastructures are above all pragmatic. Invested neither in (ideal) regularity or in (disjunctive) irregularity, the designer is free to employ whatever works in the particular conditions.

4. ***structure*** *- catalog of tectonic variations*
Infrastructural systems work like artificial ecologies. They manage the flows of energy and resources on a site, and direct the density and distribution of habitat. They create the condition necessary to respond to incremental adjustments in resource availability, and modify status of inhabitation in response to changing environmental conditions.

5. ***repetition*** *- typologies and programs*
Infrastructures allow detailed design of typical elements or repetitive structures, facilitating an architectural approach to urbanism. Instead of moving always down in scale fro the general to specific, infrastructural design begins with the precise delineation of specific systems within specific limits. In infrastructural urbanism, form matters, but more for what it can do than for what it looks like.

6. ***anticipation*** *- changing life of the site in time*
Infrastructures are flexible and anticipatory. They work with time and are open to change. By specifying what must be fixed and what is subject to change, they can be precise and indeterminate at the same time. They work through management and cultivation, changing slowly to adjust to shifting conditions. They do not progress toward a predetermined state (as with master planning strategies), but are always evolving within a loose envelope of constraints.

Note: I intend to reinterpret or at least apply this information in context of my particular site strategies.



site defined

history

Everyday, 2.7 million New Yorkers ride the subway. It is the essence of New York, a manifestation of its culture. However, a long episodic history precedes the existence of the world's longest rapid transit system. As New York developed into a leading global metropolis in the nineteenth century, the narrow, constrained streets of Lower Manhattan became overcrowded with surface traffic and unable to accommodate the increasing population. The development of a mass transit system allowed people to settle the desolate and often hilly fields of the northern portions of the island, and eventually the outer-boroughs as well.

The increase in development and expansion of New York proved to have a direct relationship with technology and its influence on the transit system. Horse drawn omnibuses were replaced with a superior horse car technology that ran on smooth iron rails and reached speeds of eight miles per hour forging the urban frontier northward.[1] By the 1860s, the system was failing to meet the needs of the people; a rapid transit system was needed.

New York was dubbed the "city if omnibuses" in the 1830s as horse drawn stagecoaches carrying up to 15 passengers dominated the streets.

The first rapid transit lines to serve New York were elevated, working off of steam powered locomotive, reaching an impressive 12 miles per hour. Many years of political and economic ups and downs delayed the introduction of New York's first sub-grade mass transit system until after the turn of the century.

The "Els" led to the development of new neighborhoods in Manhattan and Brooklyn.

On October 27, 1904 the subterranean world of New York was was born with the first subway embarking from City Hall on the new Interborough Rapid Transit line. It would be the first of many lines that, over the course of the twentieth century, would map out a complex matrix of tunnels and 722 miles of tracks throughout the island of Manhattan and the surrounding land masses.

East Side - Second Avenue Line

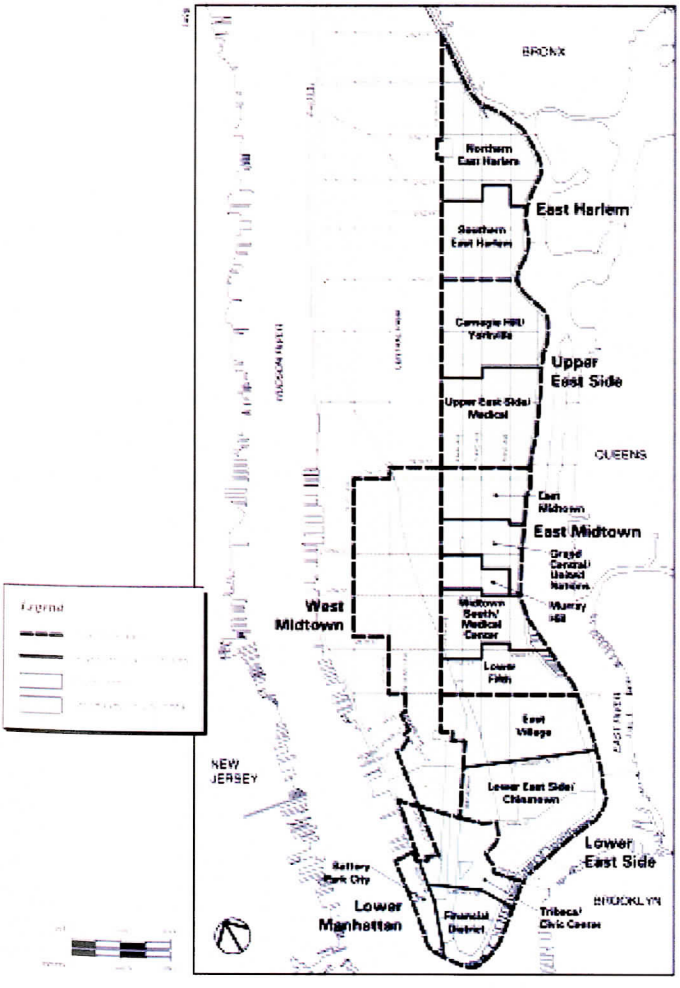
The 1940s witnessed a change in the character of the East Side of Manhattan from heavy industrial zones to corporate and residential neighborhoods resulting in a sharp increase in population density. The Second and Third Avenue "Els" which had served the area for many years were torn down in 1942 and 1956, respectively, to make room for this development.

The Lexington Avenue Line (4,5,6) became the sole artery servicing this emerging population. Not surprisingly, the Lexington Avenue Line has operated for decades as New York's most overcrowded line, causing delays in service as well as posing safety risks.

Plans for a sub-grade Second Avenue Line have been discussed since the late 1920s and finally seemed like a reality in the 1960s when detailed plans for a north-south line from the Bronx to Lower Manhattan resulted in the construction of several tunnel segments. The project, however, was suspended in the 1970s due to economic constraints. In 1995, MTA New York City Transit began a study for alternatives to alleviate the problems plaguing the East Side. After a series of public hearings, it was determined that a full-length Second Avenue Subway from 125th Street to the Financial District in Lower Manhattan was most favorable. Funds were allocated and ground breaking is scheduled for late 2004.

macro

The proposed Second Avenue Line is an incredibly charged endeavor. A project of momentous proportions, it has the ability to redefine the infrastructure of transportation as well as impose a new organizing system for Manhattan's East Side. The project impact zone is rich in both demographic diversity and varying urban condition. The new line will operate between East Harlem and the Lower Manhattan, including the Upper East Side, East Midtown, and the Lower East Side. It is arguably the most diverse few linear miles in the world.



East Harlem

Although a predominantly residential neighborhood, East Harlem is much less densely populated than other neighborhoods on the East Side. It is characterized by many tenement housing projects that often do not maintain the urban edge of the city or the grid making for visually expansive streetscapes and many superblocks. A number of institutional facilities, such as hospitals are located within the zone. More than any other zone in the study area, the development patterns is East Harlem have been largely shaped by urban renewal efforts. The emergence of the Metro-North railroad tracks from below ground onto an elevated structure north of 96th Street on Park Avenue creates a barrier between the neighborhoods east and west of Park Avenue.

East Harlem is generally made up of low-income, minority communities. Economic activity is typically limited to the service industries, although retail trade is also a significant economic generator for the zone.

Community facilities in East Harlem are dominated by schools and houses or worship. There are 45 schools within the zone. The neighborhood is characterized primarily by the nature of the housing projects, as well as several abandoned and vacant lots. Two main parks, Marcus Garvin and Thomas Jefferson, are also located in the zone.

96th Street & Second Avenue

Upper East Side

The Upper East Side is also characterized as a largely residential zone, although much more dense than East Harlem. Much of the character is defined by its proximity to Central Park ("Museum Mile"), the western boundary of the zone. The eastern boundary is comprised of many medical and institutional facilities as well as some light industrial uses. Small concentrations of residential towers have emerged although much of the zone is constituted by small-scale townhouses. Ground floor retail dominate the major avenues and cross streets.

The zone is considered well-established with regard to median household incomes, with nearly 90 percent of the 200,000 residents White. Economic activity is centered around the institutional uses, including hospitals, museums, and schools which also employ a large percentage of the service industry workforce. Each avenue offers a different retail market character except fro Fifth and Park Avenues which do not contain retail activity.

Community facilities in the Upper East Side are also dependent on schools, houses of worship, and small parks and plazas. The zone has the densest concentration of private school in the city. Virtually, the entire zone has a prosperous residential character with well-kept apartment buildings and brownstones and strong shopping areas.

72nd Street &
Second Avenue

East Midtown

The East Midtown zone covers an expansive area, comprised of many different neighborhoods. It is typically understood as a business center, although there is a sizable resident population. The scale of construction varies from east to west, with larger corporate structures replacing smaller residential fabric as one moves west. The character of East Midtown can also be divided between north and south at 34th Street; south characterized by many hospitals and extensive residential tower projects and the north a more highly trafficked commercial neighborhood consisting of market-rate high rises.

East Midtown residents are primarily White, with an average age generally higher than the other study zones. Median income is high and increases as one approaches the north. More than 150 million square feet of office space, with many buildings bearing the name of national or international corporations, define the economic forces of the zone. The international presence is enforced by the United Nations. Retail activity along Fifth Avenue is also a highly identifiable economic condition.

A dense concentration of community facilities exists near Stuyvesant Town and Peter Cooper Village. Again, many hospitals are located on the east side of Manhattan below 25th Street. Union Square Park and Stuyvesant Park are major recreational and cultural centers.

54th Street &
Second Avenue

Lower East Side

Ethnic diversity allows for small distinctly characterized neighborhoods such as Chinatown and Little Italy. Specialized shopping areas and a thriving entertainment scene (restaurants, bars, and clubs) draws people from throughout the city. Building typology remains fairly consistent throughout: low-rise tenement buildings, with the exception of "superblock" housing projects on the far east.

The shopping and entertainment diversity is a hinge for the local economy in the Lower East Side. Important nodes of retail activity are dispersed throughout the entire zone, such as Canal Street in Chinatown, Astor Place, Broadway, and Union Square. Demographically, the Lower East Side is made up of a large number of minority residents as well as Asian concentrations such as in Chinatown. Annual household income is substantially lower than the average for the entire east side study zone.

The zone has the highest concentration of community facilities. This includes a large number of public and private schools as well as post-secondary institutions (including NYU, Cooper Union). Several police and fire stations also blanket the area. The ethnic diversity is reflected in the variety of houses of worship. Several public open spaces, including landscaped yards of public housing projects serve the public.

Houston Street &
Second Avenue

Lower Manhattan

As the oldest portion of Manhattan, downtown has the most unique urban condition of the study area, characterized by narrow, irregular, and crowded streets. The 1960's witnessed the development of large office buildings that now engulf the area. The construction of Battery Park City and adaptation of the TriBeCa neighborhood in the 1980's established residential communities downtown and dramatically increased population. The northern area of Lower Manhattan, known as the "Civic Center," houses many government buildings such as Police Headquarters, Courts and City Hall. The southern sector comprised of the Financial District. Of course, the former World Trade Center site now plays an important role in the image, as well as the future of Lower Manhattan.

As a major employment zone for the metropolitan area, Lower Manhattan is a symbol of the capitalist world. Governmental services also contribute as an economic generator for Lower Manhattan. As Battery Park City continues to develop, so does the number of commercial, entertainment, and recreational services. Clearly, Lower Manhattan is currently suffering from economic decline; however, there is a lot of energy behind initiates for redevelopment.

With a limited, yet growing residential population, Lower Manhattan has few community facilities. An asset to the area, however, is historic Battery Park, second only to Central Park.

Wall Street &
Nassau Street

second avenue corridor

Much like any of the major north-south avenues in New York, Second Avenue corridor intersects many diverse localities. As illustrated graphically (see page 14), the demographic and economic conditions vary greatly between these particular districts. To some degree, this variation is manifested in the urban condition of the corridor and its surroundings whether it be building heights, urban edge, or open space.

Second Avenue, however, is located on the periphery with respect to the core of Manhattan's activity; the condition of the north-south corridor only a few short blocks east is a contrast to that of Second Avenue. For example, four or five-story commercial buildings in Midtown are often dwarfed by the high-rise backdrop formed by the condition to the west.

One might argue that the presence of transportation, such as a subway, acts as a catalyst for expansion. In addition to increasing real estate value, it serves as a magnet for residential and commercial development. It is a theory that has been proven over time in the study of city planning. The highway and the car, for example, provide the framework necessary for the rise of suburban sprawl. Robert Moses couldn't build the highways fast enough, as each successive one increased the demand exponentially.

Although operating at very different scales during a very different time period, the images to the right illustrate the way in which an infrastructural framework can precede the evolution of a neighborhood; its mere presence acting as generator for settlement.

In many parts of the metropolitan area, the infrastructural marking of the street grid preceded the development. In the above 1910 photo, ribbons in a field mark what would become the Soundview section of the Bronx.

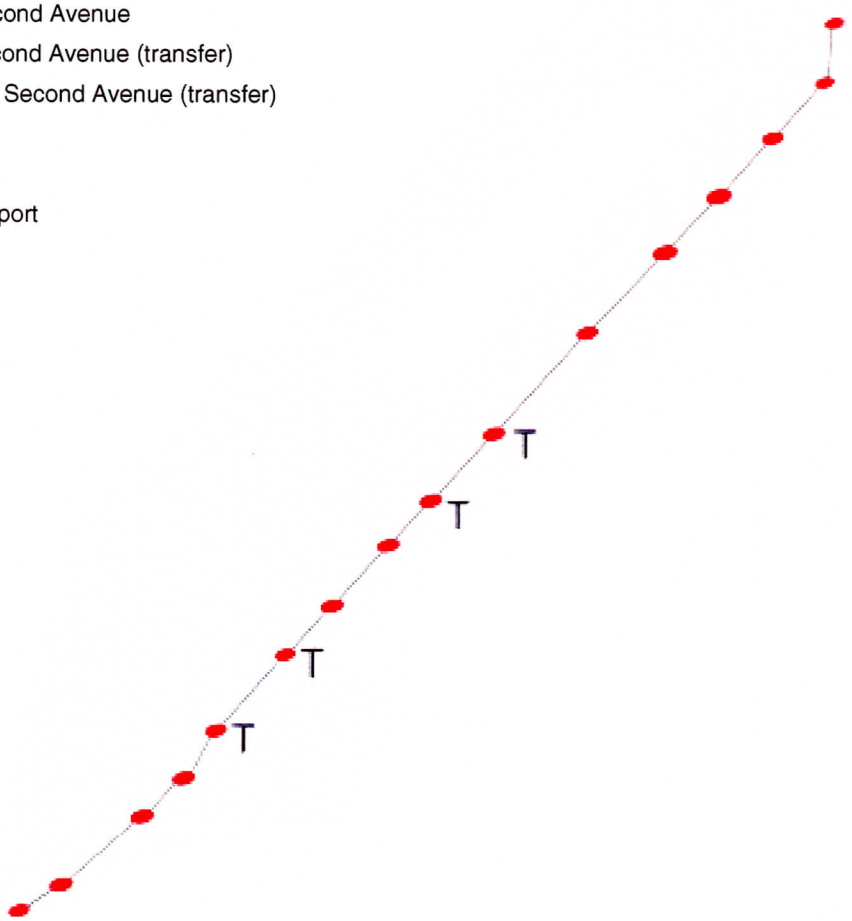
The completion of the Ninth Avenue "El" spurred residential and commercial development along its corridor.

The suburb is dependent upon the infrastructure of the highway to maintain its existance.

Points of Engagement

Much unlike the condition of the street, the subway tunnel by nature offers a homogenous condition throughout. Only at the points of the station is the opportunity to engage the life of the street provided. Along the Second Avenue Line, stations are proposed approximately 1/2 mile apart. They are as follows:

- 125th Street & Lexington Avenue
- 116th Street & Second Avenue
- 106th Street & Second Avenue
- 96th Street & Second Avenue
- 72nd Street & Second Avenue
- 57th Street & Second Avenue (transfer)
- 42nd Street & Second Avenue (transfer)
- 34th Street & Second Avenue
- 23rd Street & Second Avenue
- 14th Street & Second Avenue (transfer)
- Houston Street & Second Avenue (transfer)
- Grand Street
- Chatham Square
- South Street Seaport
- Hanover Square



Journey to Work

Median Household Income

2nd Avenue Line

4 5 6 Lexington Avenue Line

125th St. & Lexington
116th St.
106th St.
96th St.
86th St.
72nd St.
54th St.
42nd St.
34th St.
23rd St.
14th St.
Houston St.
Canal St. & Centre St.
Chamber St. & Centre St.
Fulton St. & Nassau St.
Broad St. & Wall St.

130 120 110 100 90 80 70 60 50 40 30 20 10 0 Numbers in thousands

Local Service
Express and Local Service

125th St. 116th St. 110th St. 103rd St. 96th St. 86th St. 77th St. 68th St. 59th St. 51st St. Grand Central 33rd St. 28th St. 23rd St. Union Sq. Astor Pl. Bleecker St. Spring St. Canal St. Brooklyn Bridge Fulton St. Wall St. Bowling Green

AM Peak
Average Headway (minutes)
Median Dwell Time (seconds)

125th St.	116th St.	110th St.	103rd St.	96th St.	86th St.	77th St.	68th St.	59th St.	51st St.	Grand Central	33rd St.	28th St.	23rd St.	Union Sq.	Astor Pl.	Bleecker St.	Spring St.	Canal St.	Brooklyn Bridge	Fulton St.	Wall St.	Bowling Green
2.47 m					2.61 m		2.99 m	2.6 m	2.92 m	2.66 m				2.93 m					2.86 m			
36 s					39 s		30 s	51 s	44 s	51 s				42 s					36 s			

Subway/Railroad
Bus
Autos & Taxis
Walk
Other

240 220 200 180 160 140 120 100 80 60 40 20 0 Employment in thousands

		A	B	C	D	E	F	G	H
Manufacturing	A								
Transportation, Communication	B								
Wholesale Trade	C								
Retail Trade	D								
Finance, Insurance, Real Estate	E								
Service	F								
Public Administration	G								
Other	H								

White
Black
Asian
Hispanic

100% 75% 50% 25% 0

$100K $90K $80K $70K $60K $50K $40K $30K $20K $10K $0K

Median Annual Income
% Below Poverty Level

Northern East Harlem | Southern East Harlem | Carnegie Hill/Yorkville | Upper East Side/Medical Ctr. | East Midtown | Grand Central/UN | Murray Hill | Midtown South/Medical Center | Lower Fifth | East Village | Lower East Side/Chinatown | Battery Park City | Tribeca/Civic Center | Financial District

Manhattan Population: 1,487,536

Total Population: 108,468

Total Population: 202,690

Total Population: 150,140

Total Population: 186,176

Total Population: 23,631

EAST HARLEM

UPPER EAST SIDE

EAST MIDTOWN

LOWER EAST SIDE

LOWER MANHATTAN

micro

Nested within the large scale implication of this urban infrastructural proposal are a series of particular localities. These communities "plug-into" the greater system yet must be examined and designed in reference to the specific site pressures, temporal intensities and spatial practices. It is at this scale that the infrastructure and materials which flow through it can become more significant than static political boundaries allowing the subject to engage the architecture in a constant state of negotiation. The place becomes a product of its use.

The degree of integration between the station and the life of the street may vary. On Canal Street, the infrastructure of the subway contributes to the activity of the street vendors.

Diagram of Nested Scale Condition

Defining Identity

The understanding of "place" has been described at two levels: the literal manifestations of physical conditions and the ephemeral activities conducive to such conditions, both of which are critical in analyzing and interpreting the pressures on a site.

Analysis at the micro scale (that of the particular station vicinity) can follow a similar methodical investigation as performed at the macro scale. The data, however, operates within a different frame of reference. Studies can reveal the daily operations on a site, the specific uses and flows, and systems and networks which organize the local condition.

The process, whether of analysis or design, is ultimately the same regardless of the particular condition under evaluation. In infrastructural terms, it remains faithful to a larger-scale system, as in a tree-like diagram of hierarchy. Each branch, however, brings to the table a dynamic response and use allowing for a self-identified place to exist. To continue the analogy, each leaf takes on a different shape but contributes to a wholistic composition.

Station design rarely makes accommodates a dialogue between the above and below grade spaces the way in which this station begins to do.

Boundary

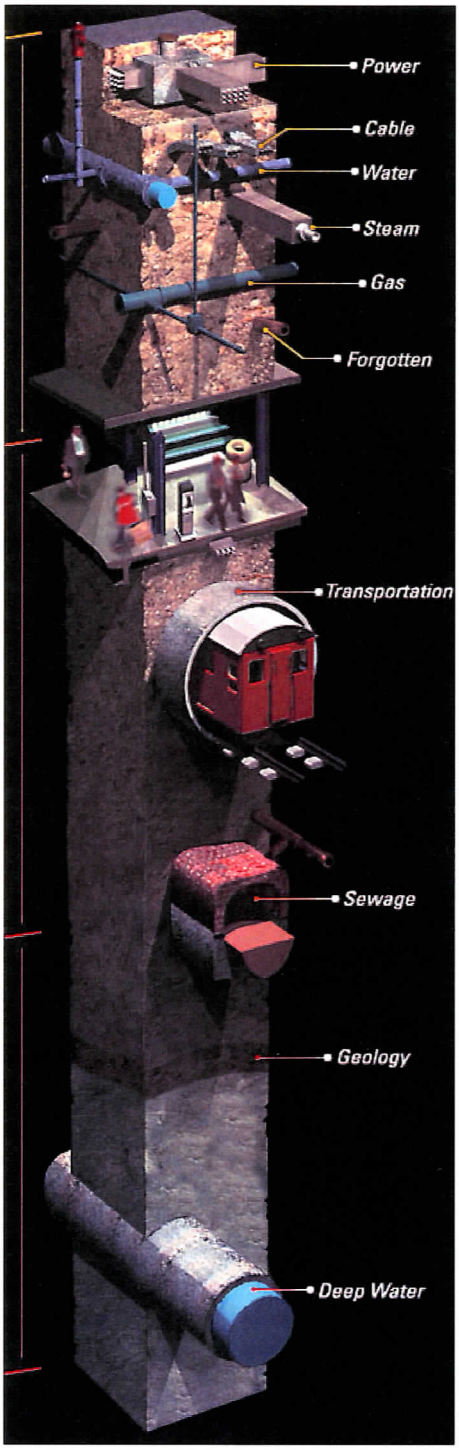
The issue of threshold and transition from one zone to another is a powerful one. Boundary can exist at many scales and in many forms. It can be clearly defined by the political delineationof a zone or district or perhaps more pertinent, the perceptual (and subjective) boundary between communities.

Boundary, however, does not have to be limited to the condition of street surface. The underground network operates as a tectonic plate below the surface that has the ability to shift boundaries or (re)negotiate the transitions occurring above. As a point of *interface* between the two zones, the station becomes the vehicle of negotiation - its inherent energy, formal spatial qualities, and contextual intensities contributing to the creation of a dynamic infrastructural place.

As a topic of investigating the micro condition, boundary can store a wealth of design possibilities. It is an issue that begs exploration in plan, section, and perspective.

Diagram of the
Blurring of Boundary

vertical + horizontal



Programmed Urban Surface

A complex network of systems, both visible and hidden, is critical for a city to operate. There are practical needs such as the supply of resources, disposal of waste, and the movement of people which are served by such systems. One might argue that in a dense urban environment such as New York that the ability to conceal these infrastructural systems best serves the surface of the street; it allows for an uninterrupted ground plane and maximizes habitable square footage.

As a result, the elements of the underground infrastructural systems only become apparent when serving tangible components at grade - the fire hydrant, traffic light, telephone booth, sewer drain, and subway station entrance to name a few. They begin to dot the landscape and act as a distant indicator of the complex system operating below the surface. In a way, they begin to program the urban surface, but should the significance of these elements in the urban environment be limited to practical and efficient points of interaction? Is there something to be gained from exploiting their complexities and their properties of organization?

These elements are examplesof how infrastructural systems which have greater urban implications operate and inform the micro condition.

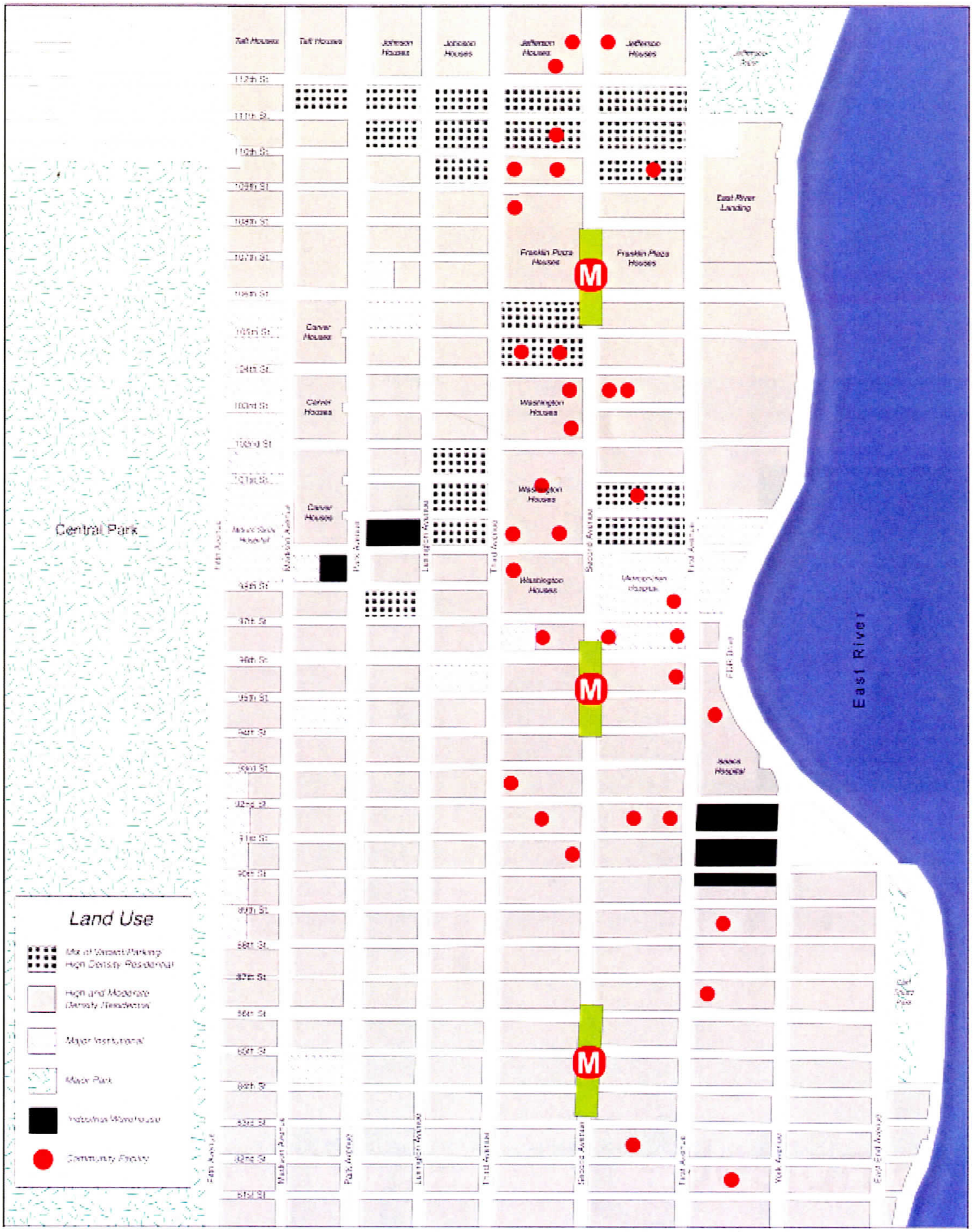
96th street station

As a boundary condition between two very contradictory districts (East Harlem and the Upper East Side), the 96th Street subway station has a plethora of influences to draw from as well as a broad palette to negotiate. Of all of the Second Avenue Subway impact zone, it represents the starkest contrast between two adjacent localities with respect to demographic composition - racially and economically. This schism transcends into the physical condition of the site with respect to building typologies, densities, and scales.

In addition to studying these surface conditions, it is equally important to understand its relationship to the condition of subgrade systems, both those in place and those with the potential for existing. Examining these realms through the filter of the statistical data will allow a formal and spatial mapping of daily practices.

Looking North towards East Harlem


Looking South towards the Upper East Side



Land Use
Central Park
East River
Taft Houses
Johnson Houses
Jefferson Houses
East River Landing
Franklin Plaza Houses
Carver Houses
Washington Houses
M

design critera

The design of the subway station plays a critical role in the user's experience. In addition to the aesthetic quality of the station, complex design criteria seeks to maximize efficiency and passenger safety. I argue that a successful design approach would embrace the "practical" criteria in a way that can enhance or instigate provocative design methodologies.

components

- *Station Entrance*

The importance of the subway entrance cannot be underestimated, as this portal is often times the only representation of the subway system at the street level. Each station will have entrance locations at two separate intersections - the primary location being at the major cross street for which the station is named accompanied by a secondary location several blocks north or south. Each intersection will provide four individual stair entrances - one at each corner with a minimum of one elevator providing handicap accessibility from the primary intersection. Off-street entrances (via building or lobby appropriation) way be desirable to accommodate elevator access or possible escalator circulation at major stations.

- *Mezzanine*

It is at this level that entry is controlled through fare collection. There are two types of mezzanines, upper and lower. Most stations in the New York City subway system are shallow and therefore only incorporate an upper mezzanine level, usually between 18-20 feet below grade. The mezzanines are key for the movement of passengers, both from platform to street and when transferring between subway lines.

- *Platform*

The platform is dedicated to passengers awaiting or disembarking a train. Length is directly related to the maximum train length operating on a line - which will require 615 foot long platforms.

The majority of stations of the Second Avenue Subway Line will incorporate center island platforms at a width of 24 feet serving north and southbound trains. Side platforms are typically 15 feet wide, yet are less efficient in terms of circulation (although two trains never disembark simultaneously).

- *Vertical Circulation Elements*

Efficiency and comfort are the primary operating factors in vertical circulation design. A combined network of stairs, escalators, and elevators connect street level to mezzanine and mezzanine to platform. A stair or two escalators 10 feet in width terminate on the center of an island platform allowing 7 feet on either side for circulation. A maximum horizontal travel distance of 300 feet to a point of egress must be accommodated.

- *Ancillary Spaces*

Amenities such as public bathrooms, and other miscellaneous spaces used by New York City Transit personnel must be accommodated.

- *Mechanical Spaces*

Engineering requirements demand that mechanical systems be in incorporated into the design of the station. Large fan plants located at both ends of station are of particular consideration.[1]

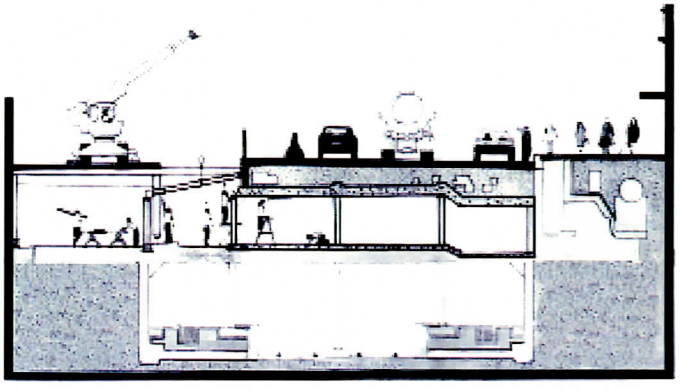
construction

Although several tunnel segments below Second Avenue remain from incomplete attempts in the 1970's, a large majority of the tunnel needs to be excavated. Cost and impact are the primary considerations when determining a construction method. Typically, the subway tunnel shall be constructed using a *tunnel boring machine (TMB)* while the actual stations will be constructed through a process of *cut-and-cover.*

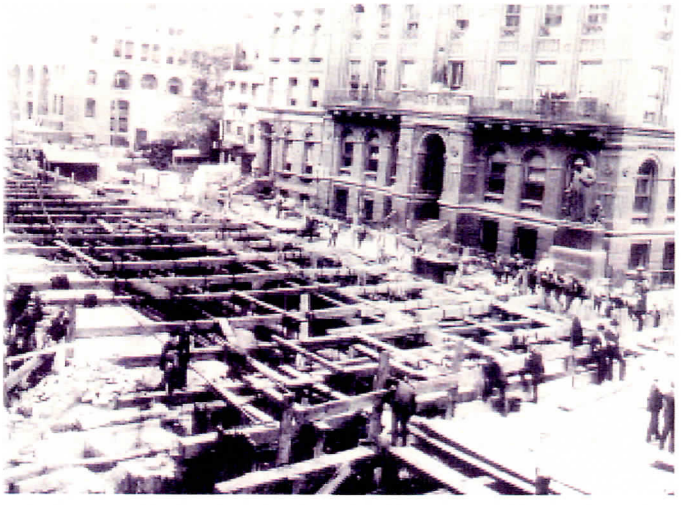
The tunnel boring machine provides minimal disruption of street activity during construction. Large diameter drills can bore the tunnel segments as well as erect precast concrete tunnel lining segments. A staging and shaft site must be located at the surface for equipment access and removal of excavated materials which traverse the tunnel via rail cars or conveyer belts.

The cut-and-cover approach was used in many of the existing subway in New York City, particularly where stations or tunnels warranted shallow excavations. Once the tunnel is deep enough, decking can be installed, and vehicular and pedestrian traffic can operate above the site. During the excavation process, the cavity walls are supported with piles, sheeting, and bracing. Although this method clearly imposes greater disruptions on the surface, construction proceeds in small phases, minimizing sidewalk and lane closures.[2]

The typical void created for a Second Avenue subway station will be approximately 1000 feet in length.



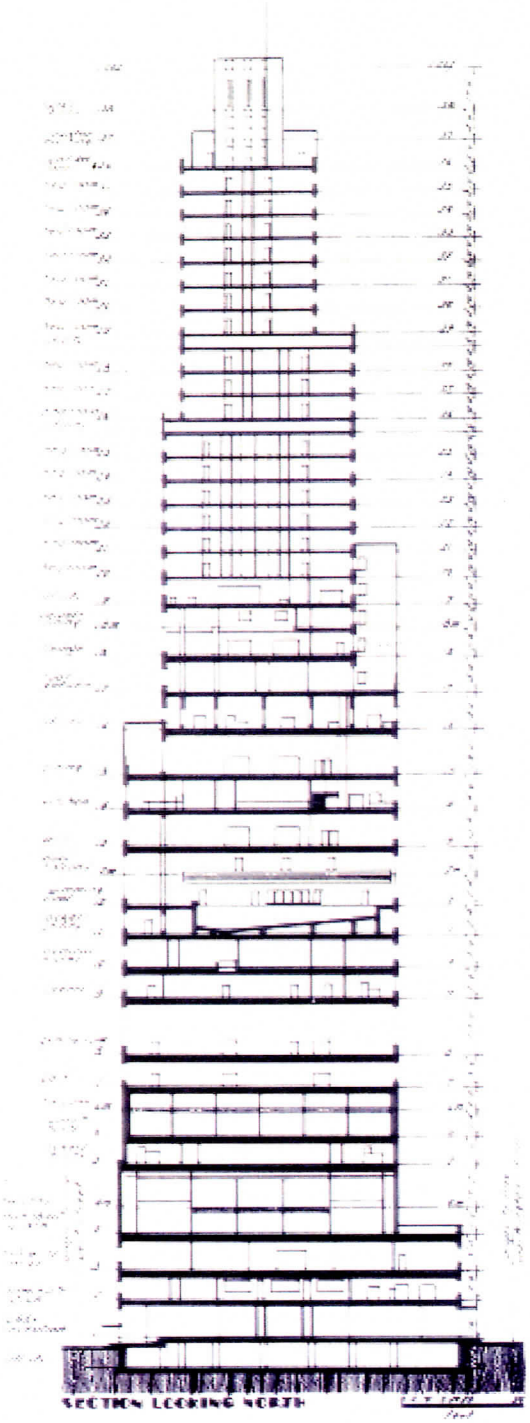
The diagram above illustrates the *cut-and-cover* method of construction that will be typical for all station locations along Second Avenue *(MESA).*



Cut-and-cover construction is not a new method, as seen in the construction of the Interborough Rapid Transit Company's Contract No.1 subway in the early 1900's. Today, however, the disruption to the street is minimized.

1. Giaccio, John. Memo (Draft), "Subway Station White Papers." 13 Mar. 2002.
2. New York City Transit. *Manhattan East Side Transit Altrenatives Study (MESA): Major Investment Study/Draft Environmental Impact Statement.* Vollmer Associates, 1999.

program

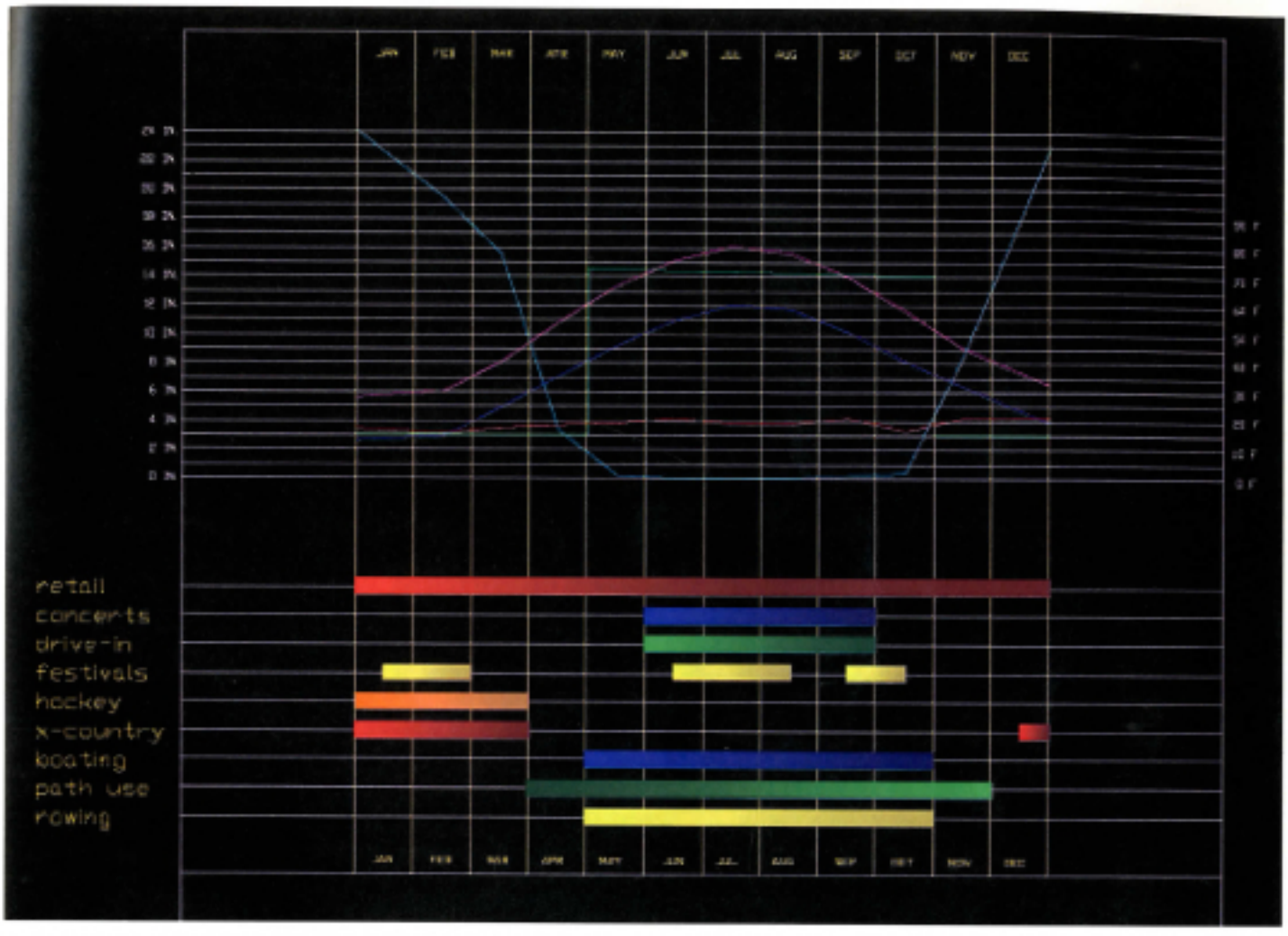


Negotiation

The seven hundred twenty-two miles of the New York City subway system constitute an autonomous subterranean metropolis dependent upon, yet formally disengaged from the life of the street. It can be compared to the skyscraper culture that Koolhaas comments on in *Delirious New York*. The advent of the elevator made possible the vertical stacking of paradoxical programmatic elements devoid of contextual relationship – the shaft zone of the elevator and its slender mechanical doors providing the only sense of threshold between the collective and the particular environments resulting in an absence of articulation. The subway, a horizontal elevator of sorts, is faced with the similar challenges of negotiating interface between the homogenous and the highly particular.

I start with this notion of a negotiation between the ground plane and the sub-grade, as I believe there are programmatic implications inherent in this area of interface. Although the specific program has not been anchored down, there are speculations as to the process and the factors which I believe will result in a honing in on the appropriate elements to engage in the design process.

Koolhaas diagram of the Downtown Athletic Club has become a symbol of the "culture of the skyscrapper" - from *Delirious New York.*



24 Hour Diagram

Continuing with the method of charting spatial practice repercussions of site, I intend to perform a 24 Hour Diagram of the uses, intensities of flows, and other temporal conditions of the 96th Street site. Much in the way in which the demographic chart of Manhattan informed the macro scale analysis, I believe this micro study will follow suit, with an even keener ability to allude to physical implications based on the data. These intensities can then be translated to the sectional axon drawings/ diagrams discussed in the last review.

Note: The diagram above is from a previous project. It is included only as a suggestion to the type of study that might be performed with a special emphasis on a time frame.

Ritual

The act of riding the subway can be a very theatrical experience; one's role is constantly in flux between an actor on a stage and member of a collective audience. The architect, through the construction of the "set" is able to inform the accidental occurrences along the way. The way in which the actors play out their role, however, is not totally predictable.

Studying this ritual - understanding the intensities that define a local condition - charge the architect with the ability to manipulate the user experience through vehicles such as the program. What are the functions that could engage the user experience in both traditional and unenvisioned ways?

Speculation

In the early stages of the "search for program" it might be helpful to speculate about the process of defining the scope. A careful examination and analysis of the particular site will be the primary generator for programmatic influences. Are there particular needs of a community, and perhaps more importantly, are there existing facilities adjacent to the proposed subway station that can be engage (particularly sectionally) in new and intriguing ways?

There are the existing functions typically associated with the underground transportation system, such as a retail concourse or newsstands. "Music Under New York" is an artistic endeavor embraced by the MTA that adds to the theatricality of the subway experience and provides an expressive form of cultural manifestations.

Most importantly, as an infrastructural proposition, the programming of such spaces need tobe flexible and responsive to its contextual needs. As a greater urban proposition, it should be a pragmatic approach that is able to take root in different parts of the city.

The programming of the underground can accommodate very fixtural elements such as retail functions, as well as a more extemporaneous events, such as entertainers.

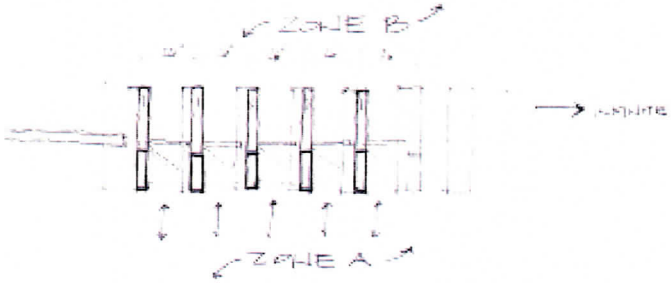
case studies

case study (1) - *turnstile*

By nature the subway station is rooted in the process of boundary making - a threshold between the sub-grade network and the surface of the city. Locally, however, a number of individual devices contribute to this system of delineation, one of which is the *turnstile.*

The turnstile can be examined as a singular mechanistic portal through which the movement of people is filtered and controlled. A series of linked vertical dividers provide the framework into which the rotating turnstile operates. It is a product of ergonomic design and efficiency that mediates intense traffic flows.

Its significance as a component of a greater infrastructural system of wall and edge, however, is critical in the political boundary making between "paid" and "unpaid" zones, an important factor in subway design. Equally important, is the experiential passage between the station entrance and the subway platform from the perspective of the patron. How does one mark this critical moment of transition in an evocative manner?



As a system of connected units, the turnstile plugs into a larger delineation of boundary. Most impressive is its ability to negotiate the demand of high levels of traffic filtering through its portals from opposite directions.

Despite its rigid creation of boundary, the turnstile is perceptually transparent allowing views to be shared. Whether it be the glimpse of an approaching train or a sign marking the next step in navigation of the circulatory system, the ability to take queues in the fast-paced movement of the underground is essential to the urbanite.

The turnstile is as a dynamic mechanism contributing to a greater infrastructural system of boundary through which passengers filter.

case study (2) - *platform [infra]structure*

The foremost space making device of the underground, and specifically of the platform, is the structural system of columns. The rhythm of the columns becomes a perceptual boundary between the platform and the tracks themselves. As the primary layer in a series organizing elements (which includes the tracks, platform edge, HVAC systems, lighting fixtures and the passengers themselves), the platform structure creates a virtual wall when viewed perspectively as is typical given the long slender nature of the platform. In many ways, this perceived boundary provides a zone of safety from the danger of the tracks.

The nature of the platform structure varies between stations, ranging from slender steel wide-flanges to large pier-like supports. This variation allows the (infra)structure itself to place an identity on the formal quality of the station platform. It can begin to serve as an orientation device for the riders on a particular subway as the train enters the station; the color, shape and distance between columns serving as an indicator, complimentary to the standard station signage. It is a perceptual queues, much like the art of the mosaic walls coverings commonly found in New York's underground.

Despite their slenderness, the columns of this particular station platform provide a virtual zone of safety for the riders. This boundary is accentuated through the painted delineation on the ground plane (left).

case study (3) - *subway map as artifact*

As an artifact attempting to portray particular graphic information, maps will vary greatly in nature. It is not uncommon to find maps representing the same geographic area take on strikingly different forms, as the map takes on the form most conducive to communicating a particular agenda.

The means by which one represents the complex network of subways on a map can reveal the hierarchical value placed on particular information. The comparison of the New York City Subway map with that of the London Underground reveals an emphasis in the former on the geography of the place through transparent representations. The inclusion of such information allows for orientation, an element that is devoid in the London map.

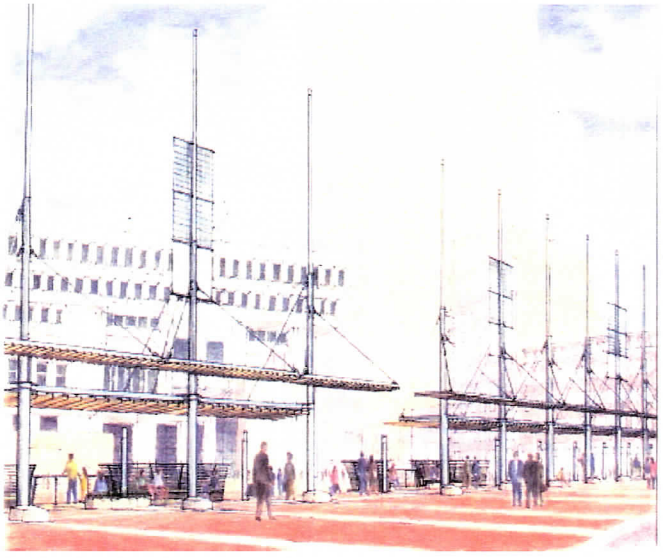
As an information latent graphic, the subway map offers an interesting approach to mapping the city. Through generic symbols (made specific through text and colors) an editing of information occurs. This is particularly true in the London map, although neither is able to convey information of building scale, fabric densities, or the sense of place.

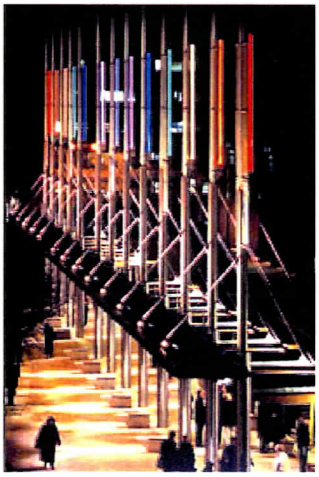
London Underground Map.

New York City Subway map (MTA).

case study (4) - *city hall plaza, boston*

In the mid-1990s, Chan Krieger and Associates received the commission for an arcade along the edge of Boston's City Hall Plaza. Four years of extensive public hearings culminated in the design of an elegant infrastructural installation, championed for its ability to serve as a catalyst for increased programmatic uses of the Plaza. The arcade reinstated the intended goals of the original Plaza design - provide a public space for social gathering - yet also improved the relationship between the Plaza and its context, in particular the Government Center subway station. Partly in response to the city's initiate to improve the Plaza, the Massachusetts Bay Transportation Authority (MBTA) has proposed a redesign of the Government Center station. This project offers a prime example of how urban infrastructural projects can reinvigorate an area and serve as a catalyst to increased development.





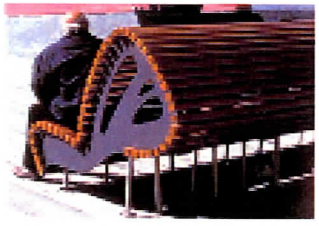
A critical component to a successful urban infrastructural project is its ability to serve program need through different times of day and seasons.

The design of the Plaza Arcade takes into consideration greater urban connections.

case study (5) - *theatre square, rotterdam*

The design firm West 8, led by Adriaan Geuze, is a leading innovative urban design and architecture firm in Rotterdam. Of their many notable works is the public square in the heart of the city. The site is located in a key area, surrounded by shops and flanked by the City Theatre and the City Concert Hall with a panoramic view of the city's skyline. As an interactive and flexible public space the design is able to accommodate changes throughout the day and season. The layout of particular elements and the treatment of the ground plane in terms of materiality directly correspond to the time of day and relationship to the sun. The configuration of the four prominent hydraulic lighting fixtures can be controlled by the inhabitants. It has all the ingredients necessary for a successful urban infrastructural project: flexible programmatic use, adaptability with respect to time, and engages the public in the act of defining the place.

The surface of the square is elevated above the context creating a natural stage upon which the "visitor becomes an actor or spectator."[1]



Key elements such as the operable hydraulic lighting (above) and benches which can be used in various ways (left) help to create an interactive public space.

The treatment of the ground plane instigates certain activities and also responds to different temporal conditions.

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The following is a list of *additional* texts which have been instrumental in understanding the issues from which I have formulated a stance:

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